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## Nutritional assessment of pre-school children of aged between 3-5 years in Kattankudy D.S.division of Batticaloa district

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### Abstract

The study was conducted in Kattankudy D.S.Division of Batticaloa district of Sri Lanka to assess the nutritional status of pre-school children. The study sample consisted of 100 children between 3 and 5 years of age. A pre-tested questionnaire was used to collect information on socio-economic status, dietary assessment, household information, anthropometric measurements, and nutritional knowledge of the mothers. Anthropometric measurements of weight, height, mid-upper-arm, head and chest circumference were collected using a standardized procedure. From those measurements anthropometric indices of height-for-age, weight-for-height, and weight-for-age were generated. The height and weight of the children were measured using properly calibrated equipment. The study revealed that 72% of the children are in normal nutritional status, 19.2% of the children are wasting and underweight, and 8.6% of the children are stunted. When educational levels of parents are concerned, it was satisfactory as 77% of mothers and 81% of fathers had secondary education. Also there were mothers with tertiary education (16%) and fathers with tertiary education (10%).The average income of the 38% of the total families was more than Rs. 40,000 per month.Only 7% of the families earn less than Rs.10,000 per month. They consume rice as the main meal, and with that, they use all types of meat (other than pork), fish, egg and green vegetables.It is concluded that the nutritional status among pre-school children between 3-5 years in Kattankudy D.S. division of Batticaloa district is satisfactory. Nutritional status of the children of this area can be furtherimproved by providing nutritional interventional programmes.

**Key words:***Anthropometric measurements, malnutrition, nutritional assessment,*

### 1.INTRODUCTION

Nutrition of pre-school children is very important, because the foundation for lifetime health, strength and intellectual vitality is laid during this period. A significant proportion of deaths of young children worldwide is due to malnutrition and efforts to reduce malnutrition should be an important task (Caulifield et al., 2004). The level of childhood malnutrition is exceptionally high in South Asia, ranging from 45-48% in India, Bangladesh and Nepal to 38% in Pakistan and 30% in Sri Lanka. The underlying

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causes of malnutrition include poverty, low levels of education, and poor access to health services (Khan and Bano, 2007). Growth monitoring is globally used to assess nutritional status and the health and development of individual children, and also to assess the overall nutritional status and health of the populations. Compared to other health assessment tools, measuring child growth is a relatively inexpensive, easy to perform, and non-invasive process.

Malnutrition in Sri Lanka continues to prevail at relatively higher levels. About 2.3% of children under five (40,000) suffer from Severe Acute Malnutrition. Poor nutrition also negatively affects school participation and performance. Sri Lanka Demographic and Health Survey highlighted (2016) that 17%, 4%, 15%, 3%, 21%, and 4% of Sri Lankan children are stunted, severely stunted, wasted, severely wasted, underweight, and severely underweight, respectively (Department of Census and Statistics, 2016). Regarding micronutrient deficiencies, nearly 19% of the population was diagnosed as iodine deficient. About 45% of pre-school children and 58% of children 5 to 11 years old suffer from anemia. More than 30% of pre-school children have marginal serum values of vitamin A (WHO, 2009). Adequate nutrition and health care during the first several years of life is fundamental to the attainment of the Millennium Development Goals (MDGs) for child survival and the prevention of malnutrition (Lutter, 2003).

Nutritional abnormalities in children are not only affected by food intake, but also by access to health services with support and quality of care for the children and pregnant mothers, as well as good hygiene habits. Although inadequate food intake is a basic cause of under-nutrition, several other factors such as living standards, water and sanitation, birth weight, birth interval and parity, weaning practices, and mother's education have been identified as contributing to incidence of malnutrition among preschool children.

There are several factors that can influence children's eating practices. Parents are one of the factors that play an important role for the development of their children. Research done by Vareecken and Maes (2010) found that children's eating practices were influenced by their mother's nutritional knowledge. The parenting attitudes had an influence on the children's weight and dietary intake. Khandareet *et al.* (2008) identified that health status of the mothers, dietary and socio economic factors can influence the nutrient intake among children. Chang *et al.* (2010) reported that low nutritional status in childhood can affect brain development. This will cause under-nutrition and poor nutritional status of the children, and can become a risk to develop a disease in their later life.

One approach to studying nutrition is to assess nutritional status on the basis of anthropometric indicators. These are based on physical body measurements such as height and weight (Jeffrey, 2006). Anthropometric indices represent the cumulative effect of access to food, nutrition practices, health, education of parents and environmental health conditions. Therefore, the nutritional status is a powerful indicator of nutrition status and well-being of an individual, and reflects the nutritional and poverty situation of a household. The nutritional status of pre-school children is a sensitive indicator, because children are most vulnerable to nutritional imbalances.

Indices of protein energy malnutrition (PEM) needs to be linked to simple anthropometric parameters. There is a need also to compare mental and academic performance of this group of children with their nutritional status, hence the need for this work. This study was carried out to determine the nutritional status of children between 3 and 5 years of age in Kattankudy D.S Division of the Batticaloa district to

find the correlation between anthropometric indicators and issues of malnutrition among primary school children.

## **2. METHODOLOGY**

### **2.1 Selection of Samples**

The study population included children aged 3-5 years in the Kattankudy area. Data collection was carried out at the primary school level. Ten pre-school children were selected from each of 10 pre-schools in the Kattankudy area. The total number of samples was 100 children. Simple random sampling method was used for the selection of the study population. Children 3 to 5 years old and free from any medical disorder such as asthma, congenital heart failure, diabetes mellitus, and kidney diseases were considered for this study. Children <3 years or >5 years old were excluded from this study.

### **2.2 Data collection**

A questionnaire was designed which includes socio- economic and health related questions and anthropometric measurements such as weight, height, and age. Questionnaires were pre-tested before collecting data to adjust the questionnaire adequately and to avoid systemic errors. After that the questionnaires were finalized and printed. Interviews with parents were used to obtain general information about nutritional status of children. Data was collected from the children's mothers, who belong to various socio-economic groups. Written informed consent was obtained from all the participants of this study.

### **2.3 Anthropometric measurements**

Anthropometric measurements were undertaken for all subjects, such as height, weight, mid-arm circumference, chest circumference, and head circumference. For measuring weight, the children were asked to stand straight in the middle of the scale's platform without touching anything and the eyes are looking at the horizontal line. For the height measurement, the children were asked to stand straight and look straight in a horizontal plane while the top of the stadiometer was lowered to the top of the head. Mid-upper-arm circumference is a measure of the diameter of the upper arm, and gauges both fat reserves and muscle mass. It is primarily used for children. It was measured by a flexible measuring tape. Measurements were taken on left hand at the level of the midpoint between acromion and olecranon, with the elbow flexed. For head circumference measurement, the tape was firmly placed over the glabella and supra-orbital ridges anteriorly and that part of the occiput posteriorly that gives maximal circumference of the head. Chest circumference was taken at mid inspiration at the level of xiphoid cartilage or sub sternal notch, in the plane at right angles to the vertebral column.

## **3. RESULTS AND DISCUSSION**

### **3.1 Distribution of Children by Gender and Age**

Distribution of children by gender and age are shown in Figure 1. According to the survey, the children aged 3–5 years includes 48% males and 52% females in the Kattankudy area. Out of 100 children, 21

were three years, 37 were four years, and 42 were five years of age. Most of the mothers participated in the survey. This helped this survey to get more household and dietary information.

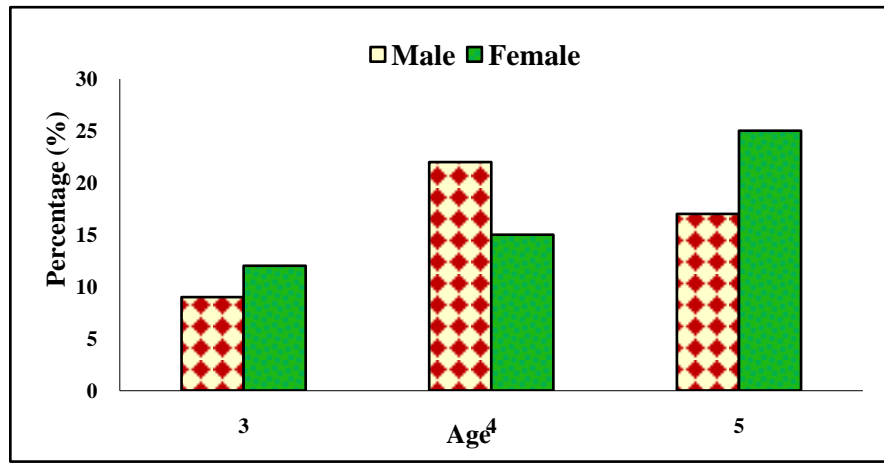


Figure 1: Distribution of Children by Gender and Age

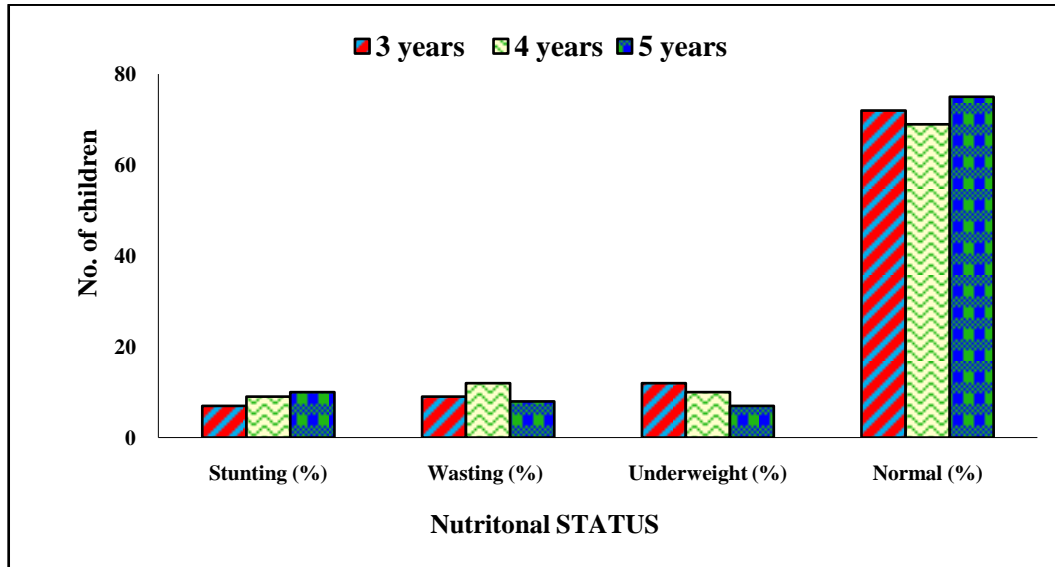
### 3.2 Food Intake

The consumption of food items which are eaten by the children was surveyed. They consume rice as the main meal, and also with that, they select all types of meat (except pork), fish, eggs and green vegetables. They consume meat three times per week. Parents with high socioeconomic status can afford first class proteins like milk, egg, meat, etc., which are sourced mainly from animals. This study showed that there is more consumption of protein rich animal foods in this area. Protein rich foods directly affect the malnutrition situation of children. The children in this area are also consuming more vegetable and dairy products. Therefore, we can significantly reduce the anemia and iron deficiency which are associated with low nutritional status. The habitual intake of chocolates, soft drinks and fast foods like tip tip were higher among preschool children. It was also observed that 79% of the children had snacks consisting of three main meals which included chocolates (68.3%), soft drinks (14.3%) and tip tip (17.4%). According to the data, children in this area eat more chocolates and fast food items. Most of the children (87%) consumed their breakfast at pre-school and they consume milk and biscuits before going to school. Others (13%) take their breakfast at home.

### 3.3 Malnutrition

Under nutrition is increasingly recognized as a prevalent and important health problem in many developing countries including India. This problem has serious long term consequences for the child and adversely influences development of a nation (Nyaruhuchaet al., 2006). Stunting and wasting are widespread among pre-children in developing countries (Jeffrey, 2006). Wasting refers to a low weight-for-height that is below 2SD of the median value of the WHO International weight-for-height reference. Underweight is defined as low weight-for-age at below 2SD of the median value of the WHO International reference for weight-for-age. Stunting refers to shortness that is a deficit or a linear growth that has failed to reach an individual's genetic potential, and it is technically defined as low height for age at below 2SD of the median value of the WHO International Growth Reference.

The nutritional status of the children (Figure 2) was evaluated using age and sex specific values of height and weight from the WHO data. The indices of under nutrition such as stunting, underweight and wasting were calculated by Z-score using the reference values of height-for-age, weight-for-age and weight-for-height of WHO standards. Three Z-scores were calculated for height-for-age Z-score (HAZ), weight-for-age Z-score (WAZ) and weight-for-height Z-score (WHZ).



**Figure 2:** Nutritional Status of Children by age group in the Kattankudy D.S. Division of the Batticaloa District

As shown in Figure 2, the average nutritional status of children revealed that 72% of the children are in normal nutritional status, 19.2% of the children are wasting and underweight and 8.6% of the children are stunting. Latest estimates on child stunting at country level shows that Sri Lanka is doing much better than all the other south Asian region countries (De Oniset al., 2012). According to the national survey 2018, stunting levels of the India, Pakistan, Maldives, Nepal, Bhutan, Afghanistan, Bangladesh and South Asia are 38.4%, 45%, 20.3%, 35.8%, 21.2%, 40.9%, 36.1% and 35% respectively. But stunting level of Sri Lanka is 17.3%. According to this survey, this division shows a better stunting level (8.6%).

In this area, the nutritional status of the children is much better. This condition is due to the consumption of more animal protein food items such as meat, fish, egg and milk. The primary cause of normal nutrition status observed in the present study are good socioeconomic status, proper vaccination and medicine, hygienic conditions, sanitation, life style, and better education. Insufficient breast feeding, type of weaning food and welfare of the household are some of the important factors that play a role in the malnutrition of children. According to the survey, breastfeeding between 1 to 6 months is 39% and breastfeeding between 7 months to a year is 33%. There were 14% who reported breastfeeding between 13 and 19 months and 6% reported breastfeeding between 20 to 24 months. Breastfeeding for less than 1 month was reported to be 8%.

### 3.4 Growth status by mid-upper-arm circumference, chest circumference, and head circumference

On the basis of observations obtained after careful measurements of circumferences of head, chest, and mid-upper-arm, the average chest circumference and head circumference are shown in Table 1.

**Table 1:** Average Chest Circumference and Head Circumference

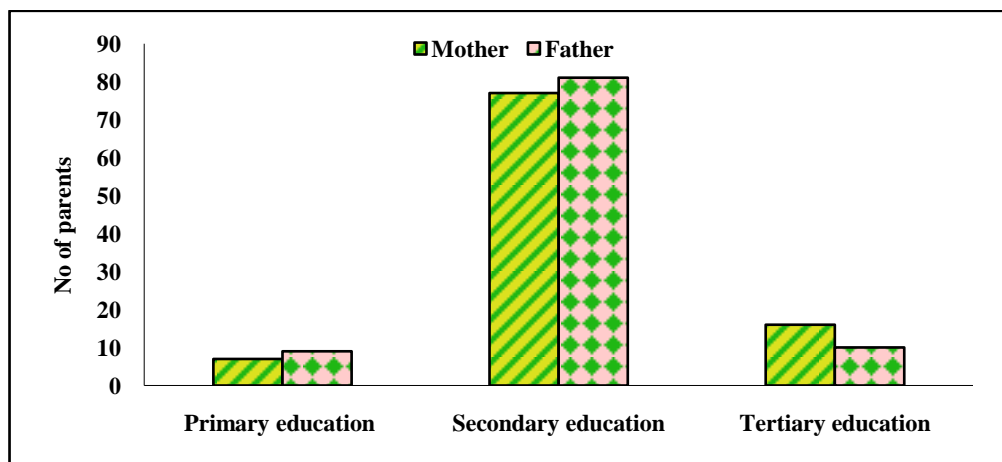
Age	Chest circumference (cm)	Head circumference (cm)
3	51.98	49.02
4	53.10	49.58
5	55.54	49.72

Between the age of 6 months to 5 years, if chest/head circumference ratio is less than 1, that may be due to failure to develop or wasting of muscle and fat in the chest wall. In our survey 100% of the children are in the normal level, which means that all children have chest/head circumference ratio higher than 1. Mid-upper-arm circumference is an important anthropometric measurement to identify acute malnutrition. Normally children with mid-upper-arm circumference less than 11cm are in a malnutrition condition. According to the survey, 89% of children are in the normal level and 11% of children are malnourished. The mean value of the mid-upper-arm circumference also shows an increase with increasing age on both sexes.

### 3.5 Members of the Family and Living Status of Children

This study showed that most families consist of four to five members, *i.e.*, there are two to three children in each family. Ninety-six percent of families depend on the father, while other families are headed by the mother while the fathers are abroad. One hundred percent of the children are living with their parents. This information helps to analyze the family background and check their living standard.

### 3.6 Education levels of parents



**Figure 3:** Educational Pattern of Parents

Education levels of parents are shown in Figure 3. The educational status in this area was satisfactory, as 77% of mothers and 81% of fathers had secondary education. Also there were mothers with tertiary education (16%) and fathers with tertiary education (10%). Mothers with only primary education (7%) and fathers with only primary education (9%) were few. When the educational level of the parents was compared with the nutritional status of the child, a significant ( $p < 0.05$ ) relationship was found between those factors. The nutritional status of the family directly affects the nutritional status of the child. In particular, mothers are the important persons in selecting food for the child.

### 3.7 Income Levels of Family

The income level of the families in this area was fairly good. Income Levels of the family are shown in Figure 4. The income of 38% of the families is more than Rs. 40,000 per month, while 13%, 28% and 14% of the families earn Rs.30,000 – 40,000, Rs.20,000 – 30,000, and Rs.10,000 – 20,000 per month, respectively. Only 7% of the families get less than Rs.10,000 per month.

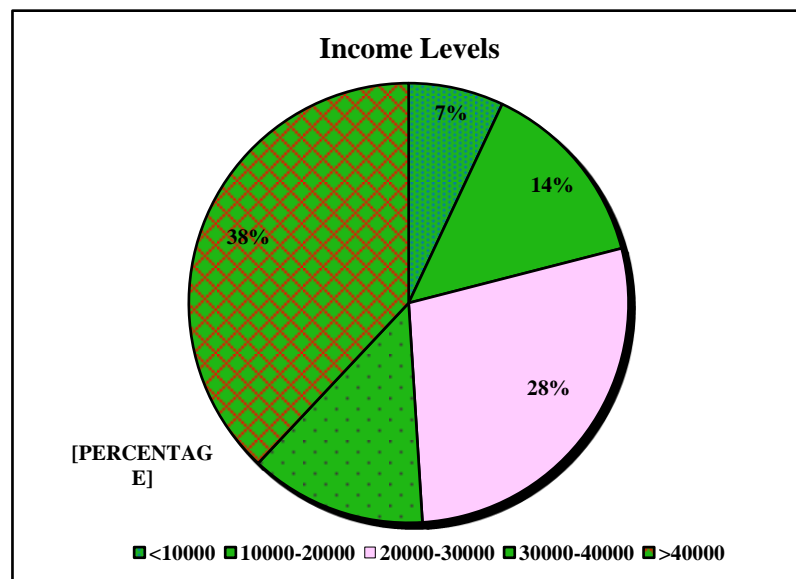


Figure 4: Income Levels of Family

The main income source in this area is business, while some have government or non-government jobs. Food stamp is one of the income sources for those with income less than Rs.10,000; they also work as labourers in private shops. In this area, most of the people have sufficient money for their family members to consume nutritional foods. Therefore, they can maintain the nutritional status of their children at a good level. According to the findings regarding income, only 7% of households in the Kattankudy area are in the category of poor households. They face difficulties in intake of sufficient food as well as nutritious food. Parents in a high income range can normally afford more nutritious food for their children than those in a low income range. This survey shows a positive relationship between nutritional status and family income.



#### 4. CONCLUSIONS

The present study provides a summary of the nutritional status of pre-school age children in the Kattankudy D.S. division of the Batticaloa District. Several factors affect the nutritional status of pre-school children in communities. Food habits, socio-economic capacity, available health facilities, environmental sanitation and geographical disparity in terms of economic development are some of the factors that should be considered in formulating the nutrition programs for children. Nutritional status and dietary habits of the children are satisfactory due to proper food intake, better education and income level of parents, and living status. Possible interventions should include a health and nutrition education program that facilitate the promotion of children's nutrition at home, physical activity, capacity building, sanitation, and hygiene in the community.

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